

CLAIMS

1. A personal back rest and seat cooling and heating system comprised of:
- a back rest;
 - 5 a seat;
 - at least one temperature sensor;
 - a temperature transfer medium contained by the back rest and the seat;
 - a cooling unit;
 - a heating unit;
 - 10 a temperature transfer medium transport means;
 - the temperature transfer medium transport means being capable of transporting the temperature transfer medium from the back rest and/or the seat into the cooling unit where the temperature transfer medium may be cooled by one or more cooling means and then once cooled the temperature transfer medium is transported
 - 15 back to the back rest and the seat by the temperature transfer medium transport means;
 - the temperature transfer medium transport means being capable of transporting the temperature transfer medium from the back rest and/or the seat into the heating unit where the temperature transfer medium may be heated by one or more heating means and then once heated the temperature transfer medium is transported
 - 20 back to the back rest and/or the seat by the temperature transfer medium transport means;
 - a user adjustable electronic controller electrically attached to the temperature transfer medium transport means, the cooling means and the heating means;
 - 25 the user adjustable electronic controller is electronically connected to the temperature sensor wherein the user adjustable electronic controller automatically and electrically activates the temperature transfer medium transport means when the temperature sensor electronically communicates to the user adjustable electronic controller that the back rest and/or the seat is a temperature that is different than that
 - 30 of a user selected temperature setting on the user adjustable electronic controller thus causing the temperature transfer medium to be transported from the back rest and/or the seat;
 - the user adjustable electronic controller automatically and electrically activates only the cooling means when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is higher than the user selected temperature thus causing the temperature transfer
 - 35

medium that has been transported from the back rest and/or the seat to be cooled by the cooling means before being transported back to the back rest and/or the seat by the temperature transfer medium transport means;

the user adjustable electronic controller automatically and electrically
 5 activates only the heating means when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is lower than the user selected temperature thus causing the temperature transfer medium that has been transported from the back rest and/or the seat to be heated by the heating means before being transported back to the back rest and/or the seat by the
 10 temperature transfer medium transport means; and

a power supply means electrically attached to the adjustable electronic controller to provide the electrical power necessary for the adjustable electronic controller in communication with the temperature sensor to activate the temperature transfer medium transport means, and either the cooling means or the heating means.

15 2. The personal back rest and seat cooling and heating system of **CLAIM 1** wherein the temperature transfer medium is water.

3. The personal back rest and seat cooling and heating system of **CLAIM 1** wherein the back rest and the seat is further comprised of a flexible channel means capable of circulating therein the temperature transfer medium.

20 4. The personal back rest and seat cooling and heating system of **CLAIM 1** wherein the cooling means is comprised of:

at least one reversible thermoelectric cooler module electrically attached to and activated by a reversible direct current of electricity that is pulsed from the user adjustable electronic controller in one direction when the temperature sensor
 25 communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is higher than the user selected temperature and in the event that the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is lower than the user selected temperature the user adjustable electronic controller automatically reverses the
 30 direction of the reversible direct current of electricity that is pulsed from the user adjustable electronic controller;

the reversible thermoelectric cooler module having an electrically reversible hot side and an electrically reversible cold side which is reversed by the user adjustable electronic controller reversing the direction of the pulsed reversible direct
 35 current such that the electrically reversible hot side becomes the electrically reversible cold side and the electrically reversible cold side becomes the electrically reversible

hot side;

at least one back rest and seat loop liquid heat exchanger attached to the temperature transfer medium transport means wherein when the temperature transfer medium transport means is activated the temperature transfer medium is pumped from the back rest and/or the seat through the back rest and seat loop liquid heat exchanger and back to the back rest and/or the seat;

the back rest and seat loop liquid heat exchanger having a front side and a back side either or both of which is formed by the electrically reversible cold side of the reversible thermoelectric cooler module such that the temperature transfer medium makes direct contact with the electrically reversible cold side of the reversible thermoelectric cooler module when pumped through the back rest and seat loop liquid heat exchanger when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is higher than the user selected temperature and in the event that the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is lower than the user selected temperature the user adjustable electronic controller automatically reverses the direction of the reversible direct current of electricity that is pulsed from the user adjustable electronic controller such that the electrically reversible cold side of the reversible thermoelectric cooler module becomes the electrically reversible hot side of the reversible thermoelectric cooler module which remains in direct contact with the temperature transfer medium;

at least one air heat exchanger;

the air heat exchanger having at least one cooling liquid channel therein;

a cooling liquid contained in the air heat exchanger cooling liquid channel;

the air heat exchanger having at least one air channel there through;

at least one air heat exchanger fan attached to the air heat exchanger;

at least one cooling loop liquid heat exchanger;

at least one cooling loop pump means capable of pumping the cooling liquid from the cooling loop liquid heat exchanger to and through the air heat exchanger cooling liquid channel and then back to the cooling loop liquid heat exchanger;

the cooling loop pump means being electrically attached to and activated by the user adjustable electronic controller when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the

back rest and/or the seat is higher than the user selected temperature

the cooling loop liquid heat exchanger having a cooling front side and a cooling back side either or both of which are formed by the electrically reversible hot side of the reversible thermoelectric cooler module, the electrically reversible cold side of which is used to form either or both of the front side or the back side of the back rest and seat loop liquid heat exchanger, such that the cooling liquid makes direct contact with the electrically reversible hot side of the reversible thermoelectric cooler module when pumped through the cooling loop liquid heat exchanger when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is higher than the user selected temperature; and

the air heat exchanger fan being electrically attached to and activated by the user adjustable electronic controller when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is higher than the user selected temperature by electrically activating the air heat exchanger fan which blows ambient air through the air channel of the air heat exchanger that has been heated by the circulating of the cooling liquid therein and then discharging the now heated blown ambient air into the surrounding ambient air.

5. The personal back rest and seat cooling and heating system of **CLAIM 4** wherein the heating means is comprised of:

at least one electric heating strip attached to the electrically reversible cold side of the reversible thermoelectric cooler module which is the electrically reversible cold side when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is lower than the user selected temperature.

6. The personal back rest and seat cooling and heating system of **CLAIM 1** wherein the cooling means is ice.

7. The personal back rest and seat cooling and heating system of **CLAIM 1** wherein the cooling means is a refrigerant gas.

8. The personal back rest and seat cooling and heating system of **CLAIM 1** wherein the heating means is the combustion of a fuel.

9. The personal back rest and seat cooling and heating system of **CLAIM 4** wherein the reversible thermoelectric cooler module is at least one Peltier device.

10. The personal cooling and heating system of **CLAIM 4** wherein the reversible thermoelectric cooler module is comprised of at least one Bismuth Telluride cube sandwiched between two ceramic plates.

11. The personal back rest and seat cooling and heating system of **CLAIM 1** wherein the cooling unit, the cooling means, the heating unit, the heating means, the temperature transfer medium transport means and the power supply are attached to a carrier capable of being worn by a user thereby making the personal back rest and seat cooling and heating system portable.

12. The personal back rest and cooling and heating system of **CLAIM 1** wherein the temperature transfer medium transport means is functionally connected to the back rest and the seat with a self sealing quick disconnect coupling.

13. The personal cooling and heating system of **CLAIM 1** wherein the cooling unit, the cooling means, the heating unit, the heating means, the temperature transfer medium transport means, the power supply and the temperature sensor are all controlled by and in communication with the user adjustable electronic controller by wireless means.

14. The personal cooling and heating system of **CLAIM 1** wherein the cooling means is comprised of:

at least one reversible thermoelectric cooler module electrically attached to and activated by a reversible direct current of electricity that is pulsed from the user adjustable electronic controller in one direction when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is higher than the user selected temperature and in the event that the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is lower than the user selected temperature the user adjustable electronic controller automatically reverses the direction of the reversible direct current of electricity that is pulsed from the user adjustable electronic controller;

the reversible thermoelectric cooler module having an electrically reversible hot side and an electrically reversible cold side which is reversed by the user adjustable electronic controller reversing the direction of the pulsed reversible direct current such that the electrically reversible hot side becomes the electrically reversible cold side and the electrically reversible cold side becomes the electrically reversible hot side;

at least one back rest and seat loop liquid heat exchanger attached to the temperature transfer medium transport means wherein when the temperature transfer medium transport means is activated the temperature transfer medium is pumped from the back rest and/or the seat through the back rest and seat loop liquid heat exchanger and back to the back rest and/or the seat;

the back rest and seat loop liquid heat exchanger having a front side and a back side either or both of which is formed by the electrically reversible cold side of the reversible thermoelectric cooler module such that the temperature transfer medium makes direct contact with the electrically reversible cold side of the reversible thermoelectric cooler module when pumped through the back rest and heat loop liquid heat exchanger when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is higher than the user selected temperature and in the event that the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is lower than the user selected temperature the user adjustable electronic controller automatically reverses the direction of the reversible direct current of electricity that is pulsed from the user adjustable electronic controller such that the electrically reversible cold side of the reversible thermoelectric cooler module becomes the electrically reversible hot side of the reversible thermoelectric cooler module which remains in direct contact with the temperature transfer medium;

at least one cooling fin attached to the electrically reversible hot side of the reversible thermoelectric cooler module when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is higher than the user selected temperature; and

at least one cooling fin fan that is electrically attached to and activated by the user adjustable electronic controller when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is higher than the user selected temperature thereby blowing ambient air over the cooling fin drawing heat therefrom and then discharging the now heated blown ambient air into the surrounding ambient air.

15. The personal back rest and seat cooling and heating system of **CLAIM 1** wherein the back rest and the seat are each further comprised of:

at least one liquid pack;
the liquid pack having a liquid pack fluid contained therein;
the liquid pack having a liquid pack cold side and a liquid pack hot side;

at least one reversible thermoelectric cooler module electrically attached to and activated by a reversible direct current of electricity that is pulsed from the user adjustable electronic controller in one direction when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is higher than the user selected temperature and in the event

that the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is lower than the user selected temperature the user adjustable electronic controller automatically reverses the direction of the reversible direct current of electricity that is pulsed from the user adjustable electronic controller;

the reversible thermoelectric cooler module having an electrically reversible hot side and an electrically reversible cold side which is reversed by the user adjustable electronic controller reversing the direction of the pulsed reversible direct current such that the electrically reversible hot side becomes the electrically reversible cold side and the electrically reversible cold side becomes the electrically reversible hot side;

the liquid pack hot side of the liquid pack being formed by the electrically reversible cold side of the of the reversible thermoelectric cooler module such that the liquid pack fluid makes direct contact with the electrically reversible cold side of the reversible thermoelectric cooler module when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is higher than the user selected temperature and in the event that the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is lower than the user selected temperature the user adjustable electronic controller automatically reverses the direction of the reversible direct current of electricity that is pulsed from the user adjustable electronic controller such that the electrically reversible cold side of the reversible thermoelectric cooler module becomes the electrically reversible hot side of the reversible thermoelectric cooler module which remains in direct contact with the liquid pack fluid; and

the cooling means of the personal back rest and seat cooling and heating system of **CLAIM 1** being further comprised of:

at least one air heat exchanger;

the air heat exchanger having at least one air channel there through;

at least one air heat exchanger fan attached to the air heat exchanger;

at least one cooling loop liquid heat exchanger;

at least one cooling loop pump means capable of pumping the cooling liquid from the cooling loop liquid heat exchanger to and through the air heat exchanger cooling liquid channel and then back to the cooling loop liquid heat exchanger;

the cooling loop pump means being electrically attached to and

activated by the user adjustable electronic controller when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is higher than the user selected temperature;

the cooling loop liquid heat exchanger having a cooling front side and
 5 a cooling back side either or both of which are formed by the electrically reversible hot side of the reversible thermoelectric cooler module, the electrically reversible cold side of which is used to form the liquid pack hot side of the liquid pack, such that the cooling liquid makes direct contact with the electrically reversible hot side of the reversible thermoelectric cooler module when pumped through the cooling loop liquid
 10 heat exchanger when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is higher than the user selected temperature; and

the air heat exchanger fan being electrically attached to and activated by the user adjustable electronic controller when the temperature sensor communicates
 15 to the user adjustable electronic controller that the temperature of the back rest and/or the seat is higher than the user selected temperature by electrically activating the air heat exchanger fan which blows ambient air through the air channel of the air heat exchanger that has been heated by the circulating of the cooling liquid therein and then discharging the now heated blown ambient air into the surrounding ambient air.

20 16. The personal back rest and seat cooling and heating system of **CLAIM 15** wherein the heating means is comprised of:

at least one electric heating strip attached to the electrically reversible cold side of the reversible thermoelectric cooler module which is the electrically reversible cold side when the temperature sensor communicates to the user adjustable
 25 electronic controller that the temperature of the back rest and/or the seat is lower than the user selected temperature.

17. The personal back rest and seat cooling and heating system of **CLAIM 16** wherein the heating means is comprised of:

at least one electric heating strip attached to the electrically reversible
 30 cold side of the reversible thermoelectric cooler module which is the electrically reversible cold side when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the back rest and/or the seat is lower than the user selected temperature.

18. A personal back rest and seat cooling and heating system according to
 35 **CLAIMS 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16 or 17** in which the back rest and/or the seat are convertible to a mattress suitable for a user to lie thereon.